HIGH RESOLUTION MULTIMODE FIBER IMAGE RECOVERY

By Deborah Jackson
Jet Propulsion Laboratory
California Institute of Technology

ABSTRACT

The research emphasis is on developing a cost-effective method of recovering image information from small, closely confined spaces using multimode fibers. The state-of-the-art good quality-viewing fiber, which can currently be used for performing this function, is a 0.5 mm diameter bundle containing 6000 pixels at a cost of $10,000 per fiber bundle. However, these fiber bundles are very fragile and can easily break during surgical use, thereby making instrument reliability and replacement cost a major impediment to their routine use in many applications. The advantage of working with a single multimode fiber is that it is significantly less expensive and mechanically more robust. In addition, careful choice of numerical aperture allows a higher image resolution (roughly 750,000 pixels) with a 0.5 mm diameter multimode fiber.